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INFORMATION ABOUT BEE CULTURE ^{1/}

Prepared by Apiculture Research Branch, Entomology Research Division

If you have questions that are not covered in this publication, send your inquiries to the Apiculture Research Branch, Entomology Research Division, Plant Industry Station, Beltsville, Md., 20705. For local information write to the bee inspector of your State Department of Agriculture or the Extension Service at your State Agricultural College.

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The honey bee is our only source of honey and beeswax. It produces more than 260 million pounds of honey and about 5 million pounds of beeswax annually in the United States. However, these are merely byproducts of the honey bee. Its principal role is in the pollination of over 50 different crops. If it were not for these pollinating insects, we should soon be reduced to living on cereals and nuts. The honey bee is now the most important flower-visiting insect in practically all areas. Transfer of pollen from flower to flower is so essential to seed and fruit production that beekeeping must be carried on to maintain a profitable agriculture.

Honey bees are kept by many persons as a hobby or as a side line. Apiculture, which is the keeping of bees and a study of their life and habits, holds a fascination for people in all walks of life--both young and old. A few colonies to furnish honey for the home table or to effect pollination can be kept almost anywhere. A beekeepers' organization has existed for years in the heart of New York City. If there is no close source of food, honey bees will fly several miles to find honey plants. There are about 300,000 persons who keep bees in this country, only a small percentage of whom are full-time commercial beekeepers. The latest figure of the Department of Agriculture places the total number of colonies in the United States at about 5 1/2 million.

^{1/} Mention of a proprietary product or company names does not imply their endorsement by the U. S. Department of Agriculture.

Advice to Beginners

First get a book and read the fascinating story of the honey bee. Some books are listed on page 7. Free bulletins are available from your State Extension Service. Do not plan to start with more than two to three colonies. If possible, visit a neighbor beekeeper. Talk it over with him. He may be willing to help you get started. Offer to help him so that you can get some experience. Your State college may offer a correspondence course in bee-keeping. After you gain some experience, a short course or a correspondence course would be worth while. With proper experience, a person in a favorable location can obtain from beekeeping a return that compares favorably with that from most agricultural pursuits.

Probably the best method of getting started is to purchase established colonies. This means bees, combs, and hive, complete. If you purchase established colonies, obtain them from a reliable beekeeper and be sure they are in modern hives and accompanied by a certificate of inspection to insure freedom from disease. Another method is to purchase a 3-pound package of bees with a queen and to install the bees in a hive equipped with frames containing full sheets of brood foundation. Either a 2- or 3-pound package of bees can be used when the beekeeper has an ample supply of brood combs containing sufficient pollen and honey to permit the colony to develop even though weather conditions prevent the bees from getting food. Instructions for installing usually accompany the package. A third way is to hive a swarm. With a swarm you need the same equipment as for a package. The best time to begin beekeeping with either swarms, package bees, or established colonies is in the spring, when fruit trees and dandelions are in bloom.

The beginner's equipment may consist of the following items, although it is suggested that catalogs from some of the bee-supply houses be consulted for comparable information:

- 1 10-frame hive, consisting of--
- 1 bottom board
- 1 10-frame hive body complete with frames and brood foundation
- 2 to 4 shallow supers complete with frames and thin foundation
- 1 telescoping cover
- 1 2- or 3-pound package of bees with queen
- 1 smoker
- 1 bee veil
- 1 hive tool
- 10 to 25 pounds of granulated sugar
- 4 ounces of No. 28 comb foundation wire
- 1 spur embedder

Such equipment, plus a subscription to a bee journal, costs approximately \$25 to \$35. After you have become experienced and learn how to manage your colonies, the equipment can be modified and more can be added. The standard 10-frame hive is the type generally used in the United States.

Although factory-made equipment is ordinarily the most satisfactory, some persons prefer to construct their own hives. If you do this, it is a

good plan to purchase or borrow a complete factory-made hive to use as a model. Be sure to reproduce all dimensions exactly; otherwise the bees will build combs and add propolis where it is not desired. Careful construction is necessary so that all hive parts are readily interchangeable. Plans and dimensions for a 10-frame beehive are also available from the U. S. Department of Agriculture, Agricultural Research Service, Entomology Research Division (CA-33-24 issued July 1965).

The honey produced in the shallow frames can be cut into four equal pieces and placed in individual leakproof plastic bags or may be cut in strips to fit glass jars with liquid honey poured around it. The liquid honey can be obtained by mashing the comb and straining out the wax particles. After a season or two you may wish to produce honey in the small wooden sections. To do this, however, requires more skill in handling the colony. To produce honey in the liquid form for bottling, you will need such equipment as an extractor, a knife for uncapping the combs, and a strainer.

For the beginner, the Italian bee is recommended. It is hardy, industrious, and fairly gentle, and it is the bee most commonly kept in the United States. Specially bred hybrid bees are now available, too. Some are very gentle.

Cardinal Points in Beekeeping

1. Bees need an abundant store of honey (25 or more pounds during the active season and 40 to 60 pounds going into winter), pollen, plenty of room for brood rearing, a source of water, protection from the wind, and exposure to sunlight.
2. There should be empty comb space in hives before and during a honey flow. When every cell becomes occupied with brood, pollen, or honey, the bees will swarm or stop working, and thus cause loss of honey. It is especially important to give them plenty of comb storage space to discourage swarming.
3. For successful wintering, a colony should have a young queen of high-producing stock, a large cluster of young fall-raised bees, at least 40 pounds of sealed honey, and several combs containing large areas of pollen. For these requirements a colony should have a two-story standard hive or at least a brood chamber and one super.
4. Starvation is one of the principal causes of unprofitable beekeeping. If bees are short of honey, feed them a sirup of two parts of granulated sugar to one part of water. Lack of pollen can be compensated for by using a mixture of soybean flour and brewer's yeast. This mixture is available through bee supply dealers.
5. It is unprofitable, and in many States illegal, to keep bees in box hives or log gums. These contain neither brood frames nor movable fixtures with honey. It is difficult for an inspector to examine the combs to determine whether disease is present.

6. Nectar resources may be improved by planting a crop such as sweetclover. Trees and shrubs of value for nectar and pollen production should be planted for shade and as ornamentals. Much wasteland can be utilized for these purposes.

Insecticides and Bees

Field and orchard crops are important sources of pollen and nectar for bees. Because such crops are often treated with insecticides, beekeepers frequently face a bee-poisoning problem. However, it is usually only when large areas are treated that bees are seriously affected. The occasional spraying of isolated plants or gardens may kill a few bees, but the overall effect on colonies is negligible. Complete loss of the field force or large numbers of bees dead at the hive entrance may focus attention on the problem, but less noticeable, recurring losses may leave the colonies in a more precarious condition at the end of the season. Fortunately, there seems to be little danger of contaminated honey getting into their surplus stores.

How can the beekeeper minimize losses from insecticides? He can be forewarned of areas where their large-scale use makes beekeeping difficult. Such areas may have excellent potentials for honey production, but unfortunately the beekeeper is usually not in a position to "call the shots." The best hope lies in grower-beekeeper cooperation. An enlightened grower will exercise greater care in selecting insecticides and in applying them under conditions that will safeguard the bees as much as possible.

If a beekeeper keeps posted as to the time and character of the insecticides to be applied in the vicinity of the colonies, he can judge the hazard and, if necessary, move his colonies to a temporary location out of flight range of the insecticides. If he has an opportunity to work with the farmers of his area to develop a program that safeguards bees, he should emphasize the following general rules: (1) Insecticides should not be applied to open blossoms; (2) the safest time to apply insecticides is in the late afternoon after the bees have stopped flying; early morning applications are less dangerous than those in the middle of the day, and (3) for a given insecticide, sprays are less harmful than dusts.

Diseases of Bees

Honey bees, like most living creatures, are subject to certain diseases. The diseases are infectious, and care is required to lessen their spread and minimize their harm. Consequently, a beekeeper should familiarize himself with the characteristics of healthy, normal colonies in order to recognize the signs of disease.

The most common brood diseases are: American foulbrood and European foulbrood. Nosema disease is the most serious ailment of adult bees. Most bee diseases can be controlled by proper treatment.

Honey from unknown sources should never be fed to colonies since it may carry disease-causing organisms. These bee disease germs carried by honey are harmless to man. Unless the colonies can be provided with combs of honey from healthy hives, sugar syrup should be fed.

If disease is suspected, assistance may be obtained from your State apiary inspector. Samples of brood and adult bees can also be sent for examination to the Bee Pathology Laboratory, Building A, Agricultural Research Center, USDA, Beltsville, Md. Reports of diagnoses are sent to the beekeepers and copies go to proper State apiary officials.

For a brood disease diagnosis, cut a sample of comb about 4 inches square containing the affected brood or brood remains; no honey should be present and the comb should not be crushed. For diagnosis of adult diseases or insecticide poisoning, send about 200 sick or dead bees. Mail all samples in a wooden or strong cardboard box. Do not use tin, glass, plastic, aluminum foil, or waxed paper, as these materials promote growth of mold that increases the difficulty of making a satisfactory diagnosis. Write your name and address, including ZIP code, on the box. If the sample is forwarded by an inspector, his name and address, including ZIP code, should also appear on the box or in an accompanying letter.

Most State departments of agriculture maintain apiary inspection services that make diagnoses of bee diseases and give information on methods of controlling them. A certificate of inspection insuring freedom from disease should be required in purchasing bees and used beekeeping equipment.

Bee Culture Research Laboratories in the Department of Agriculture

In the Department of Agriculture the work on bee culture and insect pollination is conducted in Apiculture Research Branch, Entomology Research Division, Agricultural Research Service, USDA, Plant Industry Station, Beltsville, Md. Most of the research is conducted at laboratories in different parts of the country in cooperation with the State agricultural experiment stations or universities. Their addresses are as follows:

Arizona--Honey Bee Pollination Investigations Laboratory, 2100 East Allen Road, Tucson, Ariz. 85721.

Louisiana--Bee Breeding Investigations Laboratory, Room 240, Agricultural Center, LSU, Baton Rouge, La. 70803.

Maryland--Bee Disease Investigations Laboratory, Building A, Agricultural Research Center, Beltsville, Md. 20705.

Utah--Wild Bee Pollination Investigations Laboratory, Room 261, F & BS Building, Utah State University, Logan, Utah 84321.

Wisconsin--Bee Management Investigations Laboratory, Room 436, Russell Laboratories, University of Wisconsin, Madison, Wis. 53706.

Wyoming--Bee Disease Investigations Laboratory, University Station, P. O. Box 3168, Laramie, Wyo. 82071.

Information on Honey and Beeswax Issued by the Department of Agriculture

Other types of assistance rendered by various agencies in the Department are indicated below.

Honey Market News (issued monthly).--Selling prices and quotations on honey, with reference to different containers, grades, and floral sources, and sales records or offered prices on beeswax, as received from beekeepers, wholesale and retail sellers, in important producing areas, together with comments on the condition of bees and honey plants, and the honey market.

United States Standards for Grades of Comb Honey (effective August 1933) and of Extracted Honey (effective April 16, 1961).--Reprinted without change in April 1957 following a 2-year review by members of the honey industry and the Department of Agriculture.

Both the market news reports and the grade standards are obtainable from the Fruit and Vegetable Division, Consumer and Marketing Service, Washington, D.C., 20250.

Production and Price Statistics.--Estimates issued three times a year by State from the Crop Reporting Board, Statistical Reporting Service, Washington, D.C., 20250, as follows: (1) In January, the yield per colony and total production of honey and beeswax for the preceding 6 years; stocks on hand for sale as of the preceding December 15, and prices of honey, by different types of sales, for the preceding 2 years. (2) Late in July, the current season's colony count and condition of bees and nectar-producing plants as of July 1, and percentages of colonies lost during the previous winter and spring. (3) In October, preliminary estimates of honey production for the current year, and stocks for sale as of September 15.

Price-Support Program.--The Agricultural Act of 1949, as amended, makes price support for honey mandatory at 60 to 90 percent of parity. The annual programs provide for the support of U.S. Grade C or better extracted honey of most flavors of that season's crop packed in containers of 5- to 70-gallon capacity. Support is carried out through farm-storage loans and by purchase agreements made by the Agricultural Stabilization and Conservation Service county offices in the counties where honey is stored. Loans and purchase agreements are available during the period April 1 through December 31.

Publications on Bee Culture

The world's literature on apiculture is extensive. Thousands of scientific and popular books have been published in all languages. Journals devoted to various phases of beekeeping are published regularly in all countries in which beekeeping is important. The following is a partial list of English language journals: Bee World, Woodside House, Chalfont Heights, Gerrards Cross, Bucks. England; Journal of Apicultural Research, Woodside House, Chalfont Heights, Gerrards Cross, Bucks. England; American Bee Journal, Hamilton, Ill.; Gleanings in Bee Culture, Medina, Ohio; and Canadian Bee

Journal, Port Hope, Ontario, Canada.

Several State beekeepers' associations distribute periodical news notes to their members.

Books

The following books for beginners cover almost all phases of practical and theoretical bee culture as well as the romance of beekeeping. Some of these books may be in your public library and also available from book dealers:

- ABC and XYZ of Bee Culture. A. I. Root Co., Medina, Ohio. Various eds.
First Book of Bees. Franklin Watts, Inc., New York, N.Y.
First Lessons in Beekeeping. C. P. Dadant, American Bee Journal,
Hamilton, Ill. Various eds.
500 Answers to Bee Questions. A. I. Root Co., Medina, Ohio. Various eds.
Hive and the Honey Bee. Roy A. Grout, Dadant & Sons, Hamilton, Ill.
(Rev. 1963).
How to Keep Bees and Sell Honey. Walter T. Kelley, Clarkson, Ky.
Various eds.
Starting Right with Bees. A. I. Root Co., Medina, Ohio. Various eds.

Other Valuable References -

- American Honey Plants. Frank C. Pellett. 1947. Orange Judd. New York.
Anatomy of the Honey Bee. R. E. Snodgrass. 1956. Comstock. Ithaca, N.Y.
Beekeeping in the Tropics. Francis G. Smith. 1960. Longmans. (London).
Bees: Their Vision, Chemical Senses, and Language. K. von Frisch.
1950. Ithaca, N.Y., Cornell University Press.
Beeswax. H. H. Root. 1951. Chemical Publishing Co. Brooklyn.
Behavior and Social Life of the Honeybees. C. R. Ribbands, 1953. Bee
Research Association. London.
Communication Among Social Insects. Martin Lindauer. 1961.
Massachusetts, Harvard University Press. Cambridge.
Dancing Bees. K. von Frisch. 1954. Methuen. London.
Honey and Your Health. B. Beck and D. Smedley. 1944. McBride. New York.
Honey in the Comb. Carl E. Killion. 114 pp. 1951. Killion and Sons,
Apiaries. Paris, Ill.
Honey Plants Manual. H. B. Lovell. 1956.
Life of the Bee. M. Maeterlinck. Dodd, Mead. New York. Various eds.
Makers of Honey. Mary Phillips. 1956.
Practical Queen Rearing. Frank C. Pellett. Jost and Kieker. Quincy,
Ill. Various eds.
Queen Rearing. H. Laidlaw and J. Eckert. 2nd ed. 1962. University
California Press. Berkeley, Calif.
World of the Honey Bees. Colin G. Butler. 1954. Collins. London.

Bee Supply Houses

The following companies handle supplies and equipment for beekeepers,

including hives, honey-house equipment, containers, bees, and queens. Most of these companies will send catalogs on request.

Dadant and Sons, Hamilton, Ill.; Diamond Match Co., Chico, Calif.; Hubbard Apiaries, Onsted, Mich.; Walter T. Kelley Co., Clarkson, Ky.; Leahy Manufacturing Co., Higginsville, Mo.; August lotz Co., Boyd, Wis.; Marshfield Manufacturing Co., Inc., Marshfield, Wis.; A. I. Root Co., Medina, Ohio; Superior Honey Co., Southgate, Calif.; Ogden, Utah; and Denver, Colo.; Williams Brothers Manufacturing Co., Portland, Oreg.; A. G. Woodman Co., Grand Rapids, Mich.; Montgomery Ward, and Sears Roebuck.

Organizations in the Beekeeping Industry

American Beekeeping Federation--Glenn Gibson, Secretary-Treasurer, P. O. Box 358 Minco, Okla., 73059.

American Honey Institute--Jack Aldworth, Executive Secretary, 333 North Michigan Avenue, Chicago, Illinois, 60601.

Eastern Apicultural Society--William R. Wiley, Secretary, 28 Porter Street, Wenham, Mass., 01984.

American Committee, Bee Research Association--G. F. Townsend, Chairman, Apiculture Department, Ontario Agricultural College, Guelph, Ontario, Canada.

Other organizations listed below have no permanent secretaries nor addresses. The name and address of the officials can usually be obtained from the American Beekeeping Federation Secretary.

American Bee Breeders Association

Apiary Inspectors of America

Bee Industries Association

Honey Industry Council of America

National Honey Packers and Dealers Association

Southern States Beekeepers' Federation

State Beekeepers' Organizations

USE INSECTICIDES SAFELY

If insecticides are handled or applied improperly, or if unused parts are disposed of improperly, they may be injurious to humans, domestic animals, desirable plants, pollinating insects, fish or other wildlife, and may contaminate water supplies. Use insecticides only when needed and handle them with care. Follow the directions and heed all precautions on the container label.



Use Pesticides Safely
FOLLOW THE LABEL

U.S. DEPARTMENT OF AGRICULTURE

